REMARKS

In the last Office Action, claims 1, 3, 4, 6 and 8 were rejected under 35 U.S.C. §102(b) as being anticipated by USPN 5,760,896 to Suzuki, and claims 2 and 9 were rejected under 35 U.S.C. §102(b) as anticipated by or, in the alternative, under 35 U.S.C. §103(a) as obvious over Suzuki. Claims 5 and 11 were rejected under 35 U.S.C. §103(a) as being unpatentable over Suzuki in view of USPN 5,870,178 to Egawa. Claims 7 and 10 were rejected under 35 U.S.C. §103(a) as being unpatentable over Suzuki in view of USPN 5,196,900 to Petterson.

Claims 14-20 were allowed, and claims 12 and 13 were objected to as being dependent upon a rejected base claim and were otherwise indicated to be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The drawings were accepted by the Examiner. The Examiner also acknowledged applicants' claim for foreign priority under 35 U.S.C. §119 and acknowledged receipt of the priority documents, thereby perfecting the foreign priority claim.

The Examiner also acknowledged consideration of applicants' information disclosure statement.

Applicants and applicants' attorney acknowledge with appreciation the allowance of claims 14-20 and the indication of allowable subject matter concerning claims 12 and 13. In view of the amendments made herein, applicants respectfully submit that claims 1-4, 6-10 and 12-20 all patentably distinguish over the combined teachings of the prior art.

In accordance with this response, claims 1, 2, 6-8, 10 and 12 have been amended to more particularly point out and distinctly claim the novel subject matter of the invention, and claims 5 and 11 have been canceled. The specification has been amended in minor respects to correct informalities.

Applicants respectfully request reconsideration of their application in view of the foregoing amendments and the following discussion.

The present invention is directed to angle detecting apparatus for determining an inclination angle of a screen or surface relative to a reference direction and to a projector utilizing the angle detecting apparatus for correcting distortion in a projected image on the basis of an inclination angle computed by the angle detecting apparatus.

As described in the specification, when an image is projected by a projector onto a screen, the image will be distorted if there is an improper positional relationship between the projector and the screen. A common type of

distortion is keystone distortion, in which one side of the projected image is larger than an opposite side due to inclination of the screen relative to the projector.

In accordance with the present invention, an angle detecting apparatus is provided for detecting or determining an inclination angle of a screen to thereby enable correction of the distortion in the projected image on the basis of the computed inclination angle. Independent claim 1 has been amended to explicitly recite an angle detecting apparatus for determining an inclination angle of a screen relative to a direction of the baseline between a pair of lenses of one or more line-type passive range-finding devices. Independent claim 12 recites a projector for projecting an image onto a screen, the projector comprising an angle detecting apparatus for determining an inclination angle of the screen, and an image-distortion correcting section for correcting distortion in the projected image on the basis of the inclination angle computed by the angle detecting apparatus. No corresponding subject matter is disclosed or suggested by the prior art references.

The primary reference to Suzuki pertains to a distance measuring device capable of accurately and easily performing a distance measurement even under circumstances when a subject being photographed has all sorts of shapes,

including various angular contrast edges (see column 2, lines 22-25). Suzuki describes that during the assembly of a passive-type distance measuring device, it often happens that the base length direction and the detecting direction are not aligned with each other so that the measured values of a pair of left and right photoelectric conversion elements will differ even though the photographic subject is at the same distance. Thus during assembly, the shift between the base length direction and the detecting direction is mechanically adjusted. While such an adjustment is effective when a photographic subject has a simple, straight contrast edge, it is not effective when the photographic subject includes a wide variety of angular contrast edges or consists of all sorts of shapes (see paragraph bridging columns 1-2).

Suzuki seeks to overcome this problem by providing a distance measuring device in which even when the image of the photographic subject has been shifted vertically with respect to the photoelectric conversion elements, the image information of the same portion of the photographic subject is virtually generated by an image information generating section whereby the distance to the subject is calculated by processing the generated image information (column 2, lines 10-21). According to Suzuki, the distance measuring device is capable of correcting an error based on a vertical image shift

which varies according to a variation in the distance of the photographic subject (column 2, lines 33-37). In one embodiment, Suzuki arranges photoelectric conversion element arrays and optical distance measuring systems horizontally and vertically in the form of a cross and uses the distance measurement result which is smaller as between a distance measuring device in a horizontal direction and a distance measuring device in a vertical direction as to the inclination of a contrast portion of the photographic subject with respect to the photoelectric conversion element arrays (column 2, lines 38-49). In this regard, the "inclination" referred to by Suzuki is the inclination of the contrast portion of the photographic subject, not inclination of a screen as in the present invention.

According to Suzuki, the distance measuring device comprises upper and lower photoelectric conversion element arrays arranged with respect to a pair of photographic subject images for detecting the pair of photographic subject images of the same portion of the photographic subject, an image information generating section for generating image information in the same direction as an image shift direction between the photographic subject images of the same portion of the photographic subject by processing left image information and right image information converted photoelectrically by the

photoelectric conversion element arrays, and an image shift quantity detecting section for detecting a shift quantity between the photographic subject images of the same portion of the photographic subject, based on a pair of left image information and right image information generated by the image information generating section (paragraph bridging columns 2-3).

It is, therefore, clear that the distance measuring device of Suzuki does not include an angle detecting apparatus for determining an inclination angle of a screen, and Suzuki does not disclose an inclination-angle computing section for computing an inclination angle of the screen relative to the direction of the baseline length on the basis of an output of a passive range-finding device, as recited in independent claims 1 and 12.

There is no disclosure whatsoever in Suzuki, Egawa, Petterson are the other references of record that would have led one ordinarily skilled in the art to modify and adopt the distance measuring devices of the references for computing an inclination angle of a screen on which an image is projected relative to the direction of the baseline length on the basis of the output of a line-type passive range-finding device, as required by the claims, for correcting distortion in the projected image on the basis of the inclination angle computed

by the angle detecting apparatus. In the absence of any such teaching, there is no basis to modify the prior art to replicate the claimed invention.

A claim rejection based upon obviousness under 35 U.S.C. §103(a) must be supported by an evidentiary basis establishing the obviousness of each limitation of a rejected claim. This burden may be satisfied by citation of a single reference which requires some form of modification to replicate the claimed invention, or by a combination of references which satisfies all claim limitations, along with a cogent line of reasoning consistent with the cited reference(s) and demonstrating how such modification or combination would have been obvious to the ordinarily skilled practitioner. Mere speculation or conclusory allegations are inadequate to meet this burden. Any modification or combination of references deemed to render an invention unpatentable must be suggested by some teaching or motivation found in the prior art. Stated otherwise, the desirability of any modification or combination urged by the Examiner must be disclosed, suggested, or motivated by the prior art. See, e.g., Symbol Technologies, Inc. v. Opticon, Inc., 935 F.2d 982, 989, 18 USPQ2d 1885 (Fed. Cir. 1991).

In the instant case, there is nothing in Suzuki or the other references that would expressly or impliedly teach

or suggest provision of an inclination-angle computing section for computing an inclination angle of a screen relative to baseline direction on the basis of an output of a passive range-finding device as required by independent claims 1 and 12.

In view of the foregoing, the application is now believed to be in allowable form. Accordingly, favorable reconsideration and passage of the application to issue are respectfully requested.

Respectfully submitted,

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January 31, 2005
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